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# THE LE@RNING FEDERATION

## LEARNING OBJECTS

### Catalogue

OCTOBER 2007

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## Introduction

This catalogue contains descriptions of high quality multimedia interactive digital content made freely available by The Le@rning Federation (TLF) to all Australian and New Zealand schools. The content described here is designed to support teaching and learning in the early years of schooling (years K/P, 1 and 2 - the first three years of compulsory schooling).


Included in this catalogue are content items, known as learning objects, for the curriculum areas of Mathematics and numeracy, Science, Sustainability and environmental education, Australian History, Civics and Citizenship and Business and enterprise.

The catalogue includes content produced by The Le@rning Federation as well as content licensed from other sources.

### Learning objects

The learning objects are generally arranged in series and are designed for defined year levels. Some of the content included here has been extracted from series which encompasses more than the early years. Depending on the series, some learning objects for higher year levels have been included. Most learning objects have voice-over audio support and sound effects. Some series also have versions of learning objects both with, and without, spoken instructions.

Details of learning objects released to date are provided in addition to a key graphic representative of a series. An asterisk (\*) on the series title indicates that not all the learning objects in that series have been released. The remaining learning objects will be released progressively. An asterisk (\*) on the learning object indicates that it has not been released.

Some learning objects in a series are aggregates. Aggregate learning objects combine a number of learning objects in a series and are identified with the symbol .

Some learning objects contain non-TLF content. See the Acknowledgements and Conditions of use in the learning objects for details.

In 2008 TLF will commence release of the first of new content specifically built for early years in Mathematics and English and this catalogue will be progressively updated.

### Accessing and viewing the content

Government and non-government education authorities in each Australian state and territory and in New Zealand have responsibility for facilitating access to the pool of digital content. Full details about how to access the content, including the necessary technical and software requirements for viewing it, can be found on the TLF website:  
[www.thelearningfederation.edu.au](http://www.thelearningfederation.edu.au).

## Mathematics and numeracy

The Mathematics and numeracy online curriculum content produced by The Le@rning Federation is designed to produce high-quality interactive multimedia learning objects that support and enhance understanding of key mathematical concepts. The learning objects are based on current research findings in mathematics education and pedagogy. They focus on mathematics concepts that are often the most difficult for students to learn and for teachers to teach and encourage higher-order thinking and problem-solving approaches.

The learning objects make use of the digital environment in innovative ways to enhance student learning. For example, some objects allow teachers to set up learning opportunities in mathematics that are normally too complex in a standard classroom; others allow students to visualise and apply mathematics concepts in new ways; others provide opportunities for repeated use by students through randomisation of learning activities; relevant and authentic contexts for exploration and skill application are a feature of others. Scaffolding of student learning and feedback in various multimodal formats are incorporated into all the learning objects.

## Number: exploring number

### Number trains series (Years P–3)

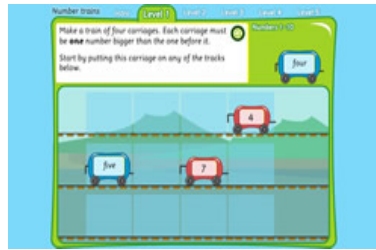
Students practise whole number sequences using numerals, quantities (eg dots) and words. Thinking is focused on considering the number that comes before and after given numbers.

#### Teacher notes

- Students place train carriages on a track in order, one at a time, by working out the number that comes before and after the number on each carriage.

#### Learning objects

	<p><b>Number trains: numbers 1 to 10</b></p> <p>L2318 – Years P–1</p> <p>Students work with whole numbers up to 10.</p> <p>Numbers are represented as words, numerals and dots, which represent quantities.</p>
	<p><b>Number trains: numbers 1 to 20</b></p> <p>L2319 – Years P–1</p> <p>Students work with whole numbers up to 20.</p> <p>Numbers are represented as words, numerals and dots, which represent quantities and numbers represented on dice.</p>
	<p><b>Number trains: numbers 30 to 50</b></p> <p>L2320 – Years 1–2</p> <p>Students work with whole numbers from 30 to 50.</p> <p>Numbers are represented as words and numerals and MAB Blocks.</p>
	<p><b>Number trains: numbers 90 to 120</b></p> <p>L2321 – Years 1–2</p> <p>Students work with whole numbers from 90 to 120.</p> <p>Numbers are represented as numerals only.</p>
	<p><b>Number trains: skip counting</b></p> <p>L2322 – Years 1–3</p> <p>Students use skip counting by twos, fives and tens.</p> <p>Numbers are represented as numerals only.</p>



## Number trains 🚂

L2317 – Years P–3

This is an aggregated learning object combining the five other learning objects in a sequence.


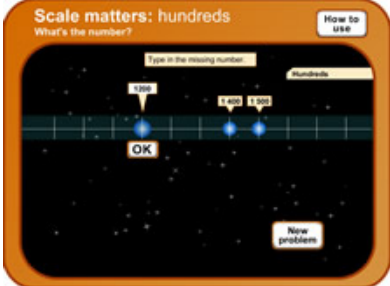
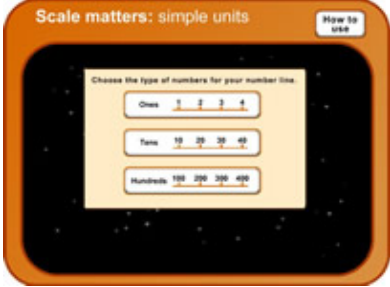
## Scale matters series (Years P–8)

Students explore a variety of experiences in the use of scale on a number line.

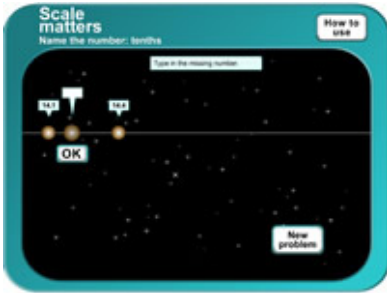
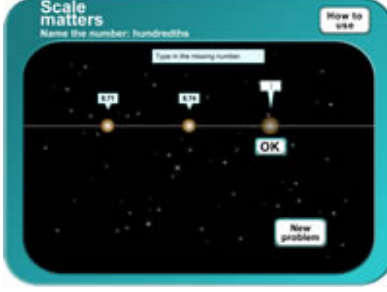
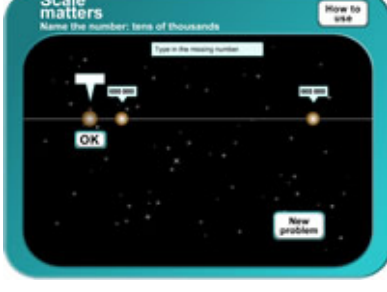
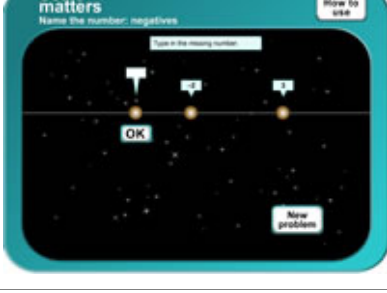

### Teacher notes

- Two activities are provided. In 'Name the number' students identify the number that corresponds to a highlighted point on the line. In 'Select the spot' students identify where a given number goes on the number line. A ruler is available to assist students after their first attempt.
- The learning objects assist student understanding of scales as diagrammatic representations reflecting the placement of unit lengths along a line; scales are additive and multiplicative, in that parts of scales can be separated and combined and scales can be discrete (whole numbers) or continuous (e.g. decimals, fractions).
- The learning objects provide feedback to the student about accuracy of placement or identification of the number.

### Learning objects

	<p><b>Scale matters: ones</b></p> <p>L2003 – Years P–2</p> <p>This learning object makes use of a scale of ones.</p>
	<p><b>Scale matters: tens</b></p> <p>L2004 – Years 2–4</p> <p>This learning object makes use of a scale of tens.</p>
	<p><b>Scale matters: hundreds</b></p> <p>L2005 – Years 2–4</p> <p>This learning object makes use of a scale of hundreds.</p>
	<p><b>Scale matters: simple units</b> 🇧🇪🇩🇪</p> <p>L2002 – Years P–4</p> <p>This is an aggregated learning object combining Scale matters: ones, tens and hundreds.</p>

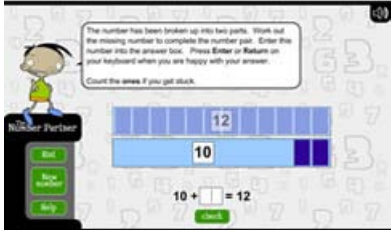



 <p><b>Scale matters: tenths</b> Name the number: tenths</p> <p>How to use</p> <p>Type in the missing number</p> <p>OK</p> <p>New problems</p>	<p><b>Scale matters: tenths</b></p> <p>L1998 – Years 4–6</p> <p>This learning object makes use of a tenths scale.</p>
 <p><b>Scale matters: hundredths</b> Name the number: hundredths</p> <p>How to use</p> <p>Type in the missing number</p> <p>OK</p> <p>New problems</p>	<p><b>Scale matters: hundredths</b></p> <p>L2000 – Years 2–4</p> <p>This learning object makes use of a hundredths scale.</p>
 <p><b>Scale matters: tens of thousands</b> Name the number: tens of thousands</p> <p>How to use</p> <p>Type in the missing number</p> <p>OK</p> <p>New problems</p>	<p><b>Scale matters: tens of thousands</b></p> <p>L1999 – Years 4–6</p> <p>This learning object makes use of a tens of thousands scale.</p>
 <p><b>Scale matters: negatives</b> Name the number: negatives</p> <p>How to use</p> <p>Type in the missing number</p> <p>OK</p> <p>New problems</p>	<p><b>Scale matters: negatives</b></p> <p>L2001 – Years 6–8</p> <p>This learning object makes use of negative numbers.</p>
 <p><b>Scale matters: range of numbers</b></p> <p>How to use</p> <p>To select the point, two numbers are shown on the number line. You have to select the point on the line where the third number should go.</p> <p>Select the point on the line where 0.7 is</p>	<p><b>Scale matters: range of numbers</b> 🧩</p> <p>L1997 – Years 4–8</p> <p>This is an aggregated learning object combining four other learning objects: hundredths, tenths, tens of thousands and negatives.</p>

## The number partner series (Years 2–4)

Students develop efficient mental arithmetic strategies by exploring part–whole relationships of numbers and using these to investigate strategies such as ‘make to 10’, ‘doubling’ and ‘counting on from the larger number’. The commutative property of addition is explored.

### Learning objects

	<h3>The number partner</h3> <p>L103 – Years 2–4</p> <p>Students are presented with a bar model to assist with addition. They are able to partition or extend numbers to use known addition facts to assist their mental computation. Addition exercises are presented to students or they can choose to create their own.</p> <p>The printout shows how the student solved the equation.</p>
	<h3>The number partner: go figure</h3> <p>L105 – Years 2–4</p> <p>This is a tutorial designed for use by the student or as a demonstration tool for the teacher. It covers information on number pairs as well as counting on from a number to work out number pairs.</p>

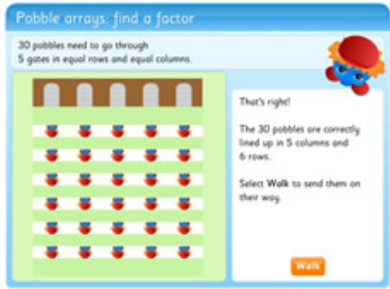


## Pobble arrays series (Years 2–4)

Students are introduced to the shift from additive to multiplicative thinking. The use of the array model of equal rows and equal columns allows the exploration of factors and multiples, and the associated number properties that underlie effective multiplicative strategies.

### Teacher notes

- Students are introduced to the commutative property of multiplication. A dynamic array provides a visual model to support understanding of the multiplicative relationship between factors.
- Pobble characters create the rows and columns for the students. Students make a prediction, test their prediction and then make adjustments, if necessary, based on feedback.

### Learning objects

	<p><b>Pobble arrays: find a factor</b></p> <p>L2057 – Year 2</p> <p>Students see a given number of pobbles and a set number of gates (columns), then have to predict how many rows are required. They check their prediction by seeing if it enables the Pobbles to line up correctly and march through the gates.</p> <p>This is the simplest of the three objects in the series. Audio instructions are provided.</p>
	<p><b>Pobble arrays: find two factors</b></p> <p>L2058 – Years 2–3</p> <p>Students see a given number of Pobbles and must firstly select the number of gates that will enable equal rows and equal columns, then predict how many rows are required. Audio instructions are provided.</p>
	<p><b>Pobble arrays: make multiples</b></p> <p>L2056 – Years 3–4</p> <p>Students are able to vary the number of Pobbles as well as select the number of gates (columns) and the number of rows to line up the Pobbles correctly into equal numbers of rows and columns.</p> <p>This is the most complex object in the series.</p>

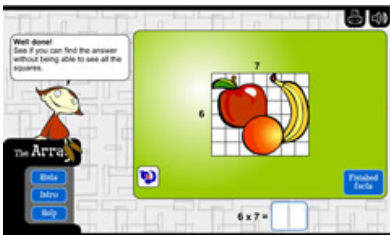

## The array series (Years 2–4)

'The array' is a tool that allows students to create arrays to learn their basic multiplication facts.

### Teacher notes

- Students are encouraged to develop mental strategies for multiplication by 'imagining' the use of 'the array'.
- The notion of commutativity is explored, for example, that  $3 \times 4 = 4 \times 3$ .

### Learning objects

	<h3>The array</h3> <p>L106 – Years 2–4</p> <p>An equation of up to <math>10 \times 10</math> presented as an equation and in array format. Students work out the answer with the visual support of the array, then supply the answer twice more with progressively less visual support.</p> <p>Students are able to see the work they have done in table format using 'finished facts'.</p> <p>An introduction and tutorial is available.</p> <p>(The printout is currently not available – October 2007.)</p>
	<h3>The array: go figure</h3> <p>L108 – Years 2–4</p> <p>This is a tutorial designed for use by the student or as a demonstration tool for the teacher. The tutorial describes the different strategies that can be employed for solving multiplication calculations. It includes a number of multiplication questions for the student. It is amenable to a screen reader.</p>

## Divide it up series (Years 2–4)

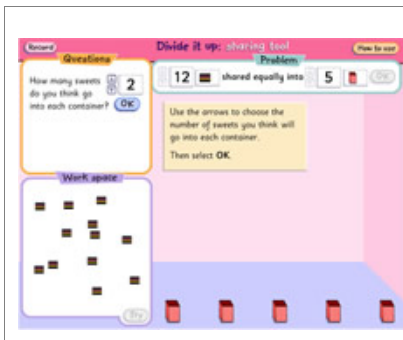
Students are encouraged to think multiplicatively to solve division problems. The learning objects involve sharing division and grouping (repeated subtraction) division in different contexts.

### Teacher notes

- Students interpret a division word problem and its solution.
- Students are supported by a tool to model the grouping or sharing division process and by scaffolding to make sense of remainders.

### Learning objects

	<p><b>Divide it up: kittens</b></p> <p>L2812 – Years 2–3</p> <p>Students share the toys amongst a specific number of cats. Remainders are dealt with as whole numbers.</p>
	<p><b>Divide it up: hardware</b></p> <p>L2811 – Years 2–3</p> <p>Students predict the number of groups of hardware items. Remainders are dealt with as fractions of the group.</p>
	<p><b>Divide it up: puppies</b></p> <p>L2808 – Years 2–4</p> <p>Students predict the number of toys or biscuits each dog will get. They then check their prediction and decide what to do with the leftover. Remainders are dealt with as either fractions or whole numbers, depending on whether the item can be sub divided.</p>
	<p><b>Divide it up: grouping tool</b></p> <p>L2810 – Years 2–4</p> <p>This is an open-ended interactive tool for modelling grouping division with whole number remainders only. Students make their own equation to solve.</p> <p>The printout shows how the student solved the equation.</p>



## Divide it up: sharing tool

L2809 – Years 2–4

This is an open-ended interactive tool for modelling sharing division with whole number remainders only. Students make their own equation to solve.

The printout shows how the student solved the equation.


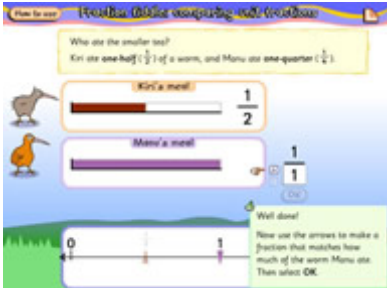
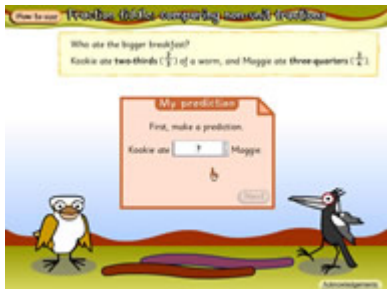
## Fraction fiddle series (Years 3–6)

Students use dynamic tools to solve problems involving fractions. Problems include comparison of the relative size of two fractions, the ordering of fractions from smallest to biggest and adding fractions.

### Teacher notes

- Students first predict the answer to a problem involving fractions. They use a dynamic tool to solve the problem then see their problem-solving displayed in different formats.
- Visual, sound and textual feedback is provided, and guided support is provided to students experiencing difficulty. Students see the results of their problem solving in different formats including an area model, the fraction's position on a number line and the symbolic fraction.
- A notebook, which can be printed on completion of the task, automatically records the problems solved.
- Randomisation of the activities supports repeated use.

### Learning objects

	<p><b>Fraction fiddle: matching cake fractions</b></p> <p>L2801 – Years 2–3</p> <p>Fran is filling orders for cakes, not everyone wants a whole cake so she needs to match the cake orders to the cakes. Students use a circular region representation tool to find the matching symbolic fraction.</p>
	<p><b>Fraction fiddle: comparing unit fractions</b></p> <p>L2802 – Years 3–4</p> <p>The hungry kiwis each ate a fraction of a worm. Students predict who ate more or who ate less. Using the fraction-making tool, students make the fractions and watch the parts of the worm appear and observe the fractions on the number line to see which one is bigger. The fractions presented are unit fractions such as <math>\frac{1}{2}</math> and <math>\frac{1}{3}</math>.</p>
	<p><b>Fraction fiddle: comparing non-unit fractions</b></p> <p>L2803 – Years 3–4</p> <p>The greedy birds each ate a fraction of a worm. Students predict who ate more or who ate less. They then make the fractions and watch the parts of the worm appear and observe the fractions on the number line to see which one is bigger. The fractions presented are non-unit fractions such as <math>\frac{2}{3}</math> and <math>\frac{3}{4}</math>.</p>





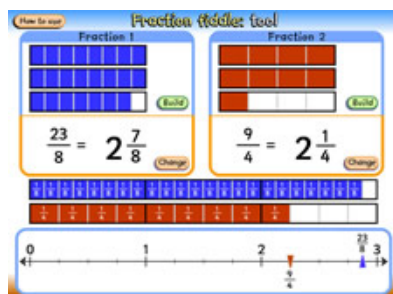
### Fraction fiddle: hit the apple

L2804 – Years 3–5

To help an archer hit an apple target, students use a number line tool to find two fractions that will add together to make one whole.

With a given denominator (1 or both) students manipulate relative size of the two fractions to make total of one whole. Reach a target of 1.

Students can repeat the problem to find different solutions.



### Fraction fiddle: tool

L2800 – Years 3–6

Students use an open-ended interactive tool that allows them to create a fraction (up to 3). They then view the symbolic notation dynamically represented both as building blocks and on a number line.

Students can build and compare two fractions.



### Fraction fiddle: shoot the hoop

L2805 – Years 4–6

Students use a number line tool to find two fractions that will add together to make one whole to help shoot a ball into the hoop.

With a given numerator (or 1 num and 1 denom given) students manipulate relative size of fractions to make total of one whole. Reach a target of 1.

Students can repeat the problem to find different solutions.



### Fraction fiddle: reach the target

L2806 – Years 4–6

Students use a number line tool to find two fractions that will add together to make the target number to make the plane hit the target.

With a given denominator (no given numbers) students manipulate relative size of fractions to make given total. Reach a given target less than 2 (not 1).

Students can repeat the problem to find different solutions.



## Fraction manipulatives (Years P–3)

These learning objects are manipulatives that allow students to explore and practise a range of concepts and operations relating to fractions.



**Fractions: naming**

Name fractions shown by shaded parts on shapes.

**Instructions**

**Indicate the number of coloured parts in the picture (numerator)**

Count how many parts of the whole unit are coloured and enter that number in the top (numerator) box.

**Indicate the total number of parts in the picture (denominator)**

Count how many parts make up the whole unit and enter that number in the bottom (denominator) box.

**Find out if your fraction name matches the picture**

Find out if your fraction name corresponds to the picture by clicking on the *Check* button.

**Ask for a new fraction to name**

To ask for a new fraction to name, click on the *New Fraction* button.

**Acknowledgements**

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**Identifiers** TLF LO ID - 3523

**Source** National Library of Virtual Manipulatives  
<http://nlvm.usu.edu>

**National Library of Virtual Manipulatives**  
<http://nlvm.usu.edu>

Learning objects	LO ID	Years
Fraction pieces	3520	P–3
Fractions: visualising	3526	P–3
Fractions: naming	3523	1–3
Fractions: parts of a whole	3524	1–3

This series contains non-TLF content. See Acknowledgements in the learning objects.

These manipulatives are each presented in template format with a description and instructions.

These learning objects are licensed from the National Library of Virtual Manipulatives, USA (<http://nlvm.usu.edu>).

## Algebra

### Monster choir series (Years P–3)

Students explore patterning using visual and auditory elements to create patterns, extend patterns, create equivalent patterns and complete patterns.

#### Teacher notes

- Students create or complete a visual sound pattern represented by different monsters.
- Both visual and sound cues are provided.
- Symbolic representations are used to show the monsters selected.

#### Learning objects



#### Monster choir: making patterns

L1056 – Years P–1

Students complete a shape pattern. By selecting different monsters to represent each of the different shapes, the student creates an equivalent sequence. They then extend this pattern to hear the whole pattern played and performed by the monster choir.



#### Monster choir: missing monsters

L1057 – Years P–2

Students create visual and sound patterns. First they select two, three or four monsters to sing the first part of their pattern. This sequence is shown using a symbolic representation. Students repeat this sequence to create the whole pattern. The monster choir plays and performs the pattern.



#### Monster choir: look and listen

L494 – Years 2–3

Students create a pattern. The student determines the first part of the pattern, which is shown as a sequence of two or three different shapes. By listening to, and selecting different monsters, the student creates an equivalent sequence. They then use auditory memory skills to replicate the sequence to extend the pattern. Feedback is given after they have made an attempt.





## Musical number patterns series (Years 1–6)

Students develop an understanding that patterns consist of repeating elements or groups of elements, are predictable and can be represented in different forms.

### Teacher notes

- Students use a counting rule to record a number pattern on a number line
- Students listen to the sound pattern created by the sequence of numbers on the line
- The structure of the rules is: 'select a starting number and a 'count by' number.
- Starting numbers are 0-3 and 'count by' numbers are up to 10.

### Learning objects

	<p><b>Musical number patterns: musical counter</b> L1063 – Years 1–2</p> <p>Students are given a rule in words to display on a musical number line to show the pattern. Up to three number lines and rules can be made and played separately or together. The number line goes up to 36.</p>
	<p><b>Musical number patterns: music maker</b> L589 – Years 2–3</p> <p>Students create a rule by selecting a starting number (from 0, 1 or 2) and a 'count by' number (up to 10). Up to three number lines and rules can be made and played separately or together. Number line goes up to 36.</p>
	<p><b>Musical number patterns: odds and evens</b> L1064 – Years 3–4</p> <p>Students are posed a problem based around odd or even numbers. Students complete a rule by selecting either a start number or a 'count by' number. The results are displayed on two musical number lines.</p>
	<p><b>Musical number patterns: musical times</b> L1065 – Years 3–4</p> <p>Students are presented with a pattern on a number line and required to create a rule for the pattern. The rule format is start at 'n' and count by <math>2 \times n</math>. Students create a second rule using a similar format.</p>



### Musical number patterns: the challenge

L1067 – Years 5–6

Students are presented with a word problem and are required to create a rule to solve it. Students then solve the same problem using a different rule.

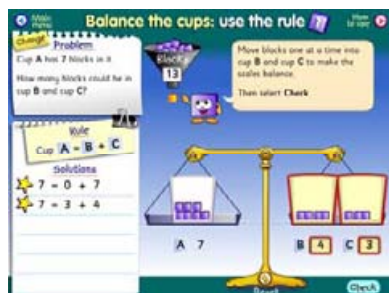
## Balance the cups series (Years 2–4)

In this series of learning objects, students experience basic algebraic thinking using a set of scales as a metaphor for equations.

### Teacher notes

- Provides experience in basic algebraic thinking by applying rules and constructing equations using strategies such as substituting values.
- Promotes understanding that an equation is an expression of equality.
- The equal-arm balance (scales) provides a dynamic model of equality that allows the student to explore number relations.
- Includes a print option that provides a record of the solution and a new similar problem to solve.

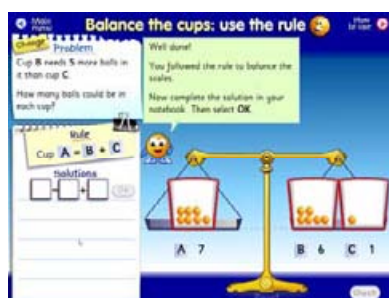
### Learning objects



#### Balance the cups: use the rule 1

L5975 Years 2–3

This is the first object series which introduces the students to the idea of a missing value in an  $A = B + C$  type equation by requiring them to move blocks into just one cup to make a balance and complete the problem.



#### Balance the cups: use the rule 2

L5976 Years 3–4

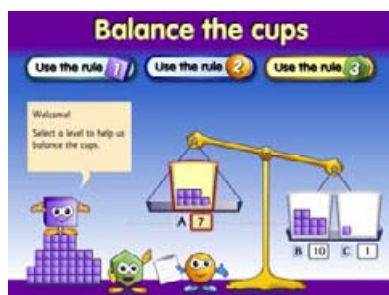
This object builds on the first object, with three missing values and a known relationship between the values in an  $A = B + C$  type equation. For example the student needs to put a four more blocks in one cup than in another cup and make the scales balance.



#### Balance the cups: use the rule 3

L5977 – Years 3–4

This object contains three missing values in an  $A + B = C + D$  type equation. For example the student needs to balance the scales by putting a different number of blocks into each of the four cups, with 2 blocks in Cup C.



#### Balance the cups 🧩

L5974 Years – 2–4

This is an aggregate of the three learning objects in the series, enabling the student to progress through the 3 learning objects.

## Colour patterns (Years P–3)

This learning object is a simple manipulative that allows students to explore and practise pattern formation.

**Colour patterns**

Complete the pattern

Complete a pattern of coloured balls.

**Instructions**

**Describe a colour pattern**

Starting from the upper left corner of the workspace, work out the sequence of ball colours.

**Extend the pattern**

Click on a ball with a question mark and then click on the appropriate colour to extend the pattern.

**Check your solution**

After you colour all the balls, click on the *Check Answer* button to find out if your solution is correct.

**Generate a new pattern**

Click on the *New Problem* button at any time to see a new pattern.

**Acknowledgements**

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Learning objects	LO ID	Years
Colour patterns	3516	P–3

This learning object contains non-TLF content. See Acknowledgements in the learning object.  
 The learning object is presented in template format with a description and instructions.

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## Space

### Shape overlays series (Years P–4)

Students manipulate 2D shapes, by sliding and overlapping, to create other 2D shapes.

#### Teacher notes

- Tasks such as making a specified shape to complete a picture puzzle require the student to consider the properties of the two original shapes and visualise how the two shapes may be overlapped to create the properties needed for the new shape.
- The level of difficulty is increased by using more complex shapes, increasing the number of shapes to choose from and using the option to rotate shapes.

#### Learning objects

	<p><b>Shape overlays: picture studio</b> L1071 – Years P–4</p> <p>Students create a picture from a range of shapes made by the intersecting shapes of overlaid shapes. Students select from four regular shapes then slide the shapes over each other to create another intersecting shape. Students cut, rotate and arrange the shape to create their own picture.</p> <p>Additional fun elements are available to add to pictures if required. A number of starter ideas are provided.</p> <p>Students can print their picture.</p>
	<p><b>Shape overlays: find and cut</b> L752 Years P–2</p> <p>The student is presented with a missing shape in a partially covered picture. To find the missing shape and see the final picture, the student slides a given 2D shape over a fixed 2D shape. They cut the shape to check that they are correct. When they have matched the missing piece the picture is revealed.</p>
	<p><b>Shape overlays: find, cut and turn</b> L1072 – Years 1–2</p> <p>The student is presented with a missing shape in a partially covered picture. To find the missing shape and see the final picture, the student selects from two given 2D shapes (including obtuse triangle, pentagon, trapezium), and slides it over a given fixed 2D shape. They cut and rotate the shape to match the missing piece and its orientation to see the picture revealed.</p>



### Shape overlays: picture puzzle

L1073 – Years 3–4

The student is presented with a missing shape in a partially covered picture. To find the missing shape and see the final picture, the student select from three 2D shapes (including scalene triangle, rhombus and pentagon) and slides it over a fixed 2D shape. They cut and rotate the shape to match the missing piece and its orientation to see the picture revealed.






## Direct a robot series (Years 2–4)

Students interpret diagram features as 2D representations of a 3D environment in a game format. Students develop their understanding of the concepts of 2D representations of 3D environments, relative position and relative direction.

### Teacher notes

- The aim of the game is to create a pathway around the obstacles, collect as many samples as possible (each having a value attached) and return to the mother ship using the least amount of fuel.
- Students are shown a map of the planet's surface including the locations of the robot, obstacles and samples. They program a pathway using direction and/or number of distance units to move the robot around the surface of a planet.
- Students must visualise the pathway assisted by the map of a planet's surface to determine the location and required movement of the robot.
- A grid is available to help with determining units of distance.
- A mission report is provided with a score.
- A printout is available.

### Learning objects

	<p><b>Direct a robot: how far?</b> L1075 – Years 2–4</p> <p>Students are presented with a partially finished route. The direction steps have been predetermined but the number of units for the moves are missing. Students select the numbers of units needed to complete the pathway, collect the samples and return to the mother ship.</p>
	<p><b>Direct a robot: which way?</b> L1074 – Years 2–4</p> <p>Students are presented with partially finished route, this time with the distance steps predetermined so the students must determine the best direction to collect all the samples and return to the ship.</p>
	<p><b>Direct a robot: collector</b> L753 – Years 2–4</p> <p>Students program a pathway by selecting both the direction and number of units the robot will move to collect all the samples and return to the ship.</p>



## Face painter series (Years 2–4)

Students explore the properties of, and relationship between, 2D shapes (polygons) and 3D objects (polyhedrons) by visualising the shapes of the faces of objects, including those distorted by perspective and hidden from view.

### Teacher notes

- Students estimate the number of a specific 2D shape that can be found on a given 3D object.
- Students rotate and view the 3D object from all perspectives and identify each instance of the 2D shape by painting it.
- Numbers of shapes correctly painted are automatically recorded and updated enabling the student to compare their estimate with the result.
- Students visualise relationships between 2D figures and 3D objects.
- The controlled way in which the object must be rotated around horizontal and vertical axes provides a more systematic approach to the exploration of the structure of the shapes than would normally be possible through physical handling of the objects.

### Learning objects

	<p><b>Face painter: finding faces 1</b> L1068 – Years 2–3</p> <p>Students estimate how many of a specific 2D shape can be found on a given simple 3D object.</p>
	<p><b>Face painter: finding faces 2</b> L653 – Years 3–4</p> <p>Students estimate how many of a specific 2D shape can be found on a given complex 3D object.</p>



## Shape maker series (Years 2–4)

Students explore the relationships between 2D shapes and 3D objects by visualising the movement (translation or rotation) of the 2D shape and predicting the resulting 3D object.

### Teacher notes

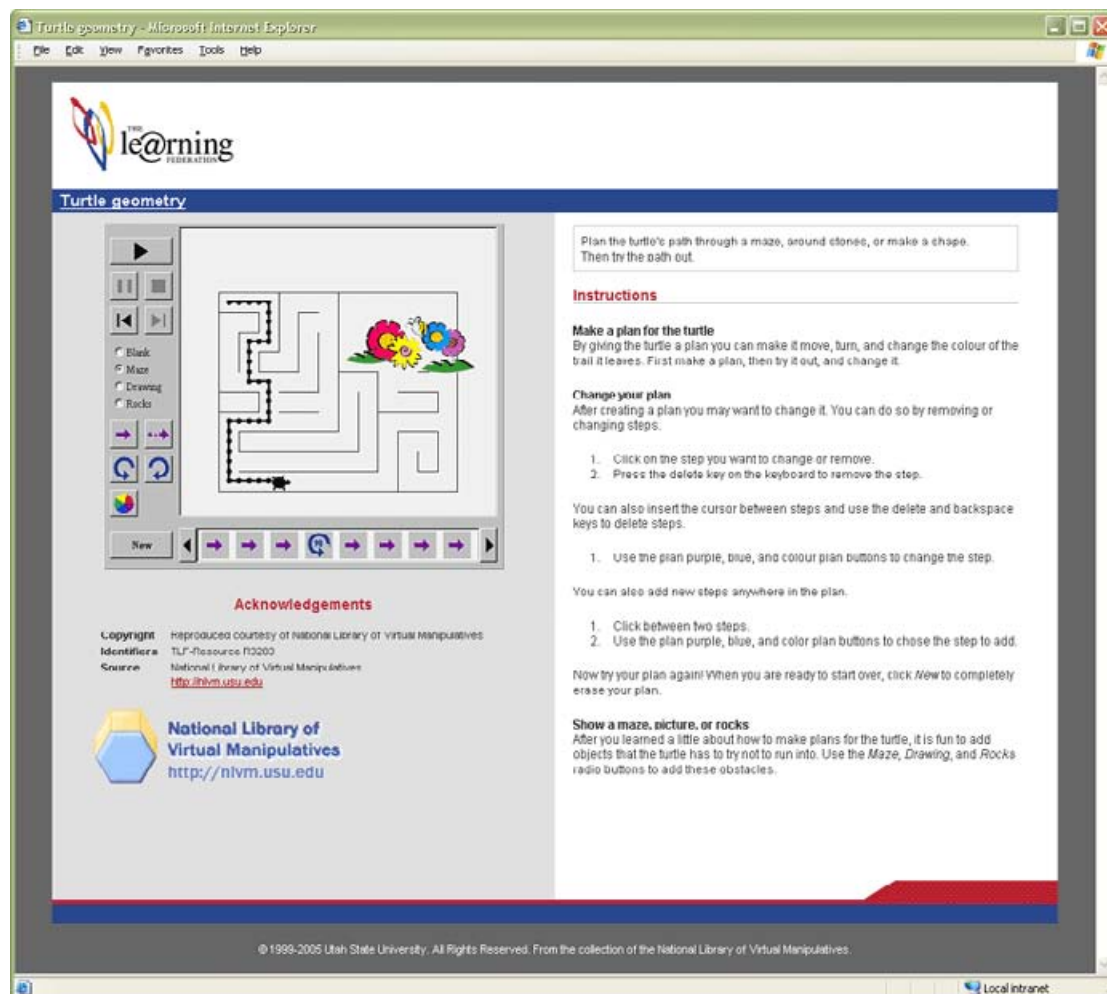
- Students are required to visualise the result from spinning or extruding 2D shapes.
- Students select from the shapes available then apply a spin or extrude action to it.
- Where students choose to spin the shape, they also select the axis for spinning (except in 'simple objects').
- Students are able to look at the cross section once the 3D object has been created.
- Printouts are available from all objects.

### Learning objects

	<p><b>Shape maker: simple objects</b> L1060 – Years 2–3</p> <p>Students select either a square or circle.</p> <p>Students build a stack of eight objects, which can then be printed out.</p>
	<p><b>Shape maker: blocker</b> L1058 – Years 3–4</p> <p>Students select from a square or circle. They then predict the resulting 3D object. If the choice is correct, the transition from 2D to 3D is shown.</p> <p>Students build a stack of six objects they have created, which can then be printed out.</p>
	<p><b>Shape maker: stacker</b> L588 – Years 3–4</p> <p>Students select from a diamond, circle and rectangle.</p> <p>The students predict the resulting 3D object. If the choice is correct, the transition from 2D to 3D is shown.</p> <p>Students build a stack of six objects they have created, which can then be printed out.</p>

## Space Manipulatives (Years P–3)

These learning objects are manipulatives that allow students to explore and practise a range of concepts and operations relating to Space.



Learning objects	LO ID	Years
Attribute blocks	3511	P–3
Ladybird mazes	3535	P–4
Pentominoes	3540	P–9
Tessellations	3547	P–9
Pattern blocks	3539	2–6

This series contains non-TLF content. See Acknowledgements in the learning objects.

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## Measurement




### Area concept series (Years P–4)

Students explore the concept of area as covering a surface, and to introduce the formula for calculating the area of a rectangle.

#### Teacher notes

- Students estimate the area of the shape (square, rectangle or L shaped) using a reference square. Students cover the shape with the square, first completing a row or a column and then copying the entire row or column to complete the shape.
- Students then calculate the area, using the dimensions of the shape to fill in the formula length X width.
- An animated multiplication table supports students who experience difficulty with calculating the product.

#### Learning objects

	<p><b>Finding the area of rectangles</b></p> <p>L384 – Years P–2</p> <p>Students work with squares and rectangles and calculate products of numbers up to 9.</p>
	<p><b>Finding the area of compound shapes</b></p> <p>L383 – Years 2–4</p> <p>Students work with L shaped shapes. Students calculate the area of each part of the L shape then add the results.</p>
	<p><b>Area Counting with Coco</b> 🎲</p> <p>L139 – Years P–4</p> <p>This is an aggregated learning object combining the two other learning objects.</p>

## Time manipulatives (Years P–6)

These learning objects are manipulatives that allow students to explore and practise a range of concepts and operations relating to the measurement of time.



### Time: analogue and digital clocks



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Explore time using an analogue (or face) clock and a digital clock showing the same time, including seconds.

#### Instructions

##### Link Clocks

With the *Link Clocks* option checked (turned on), you can set the time on either clock, and the other will match it.

To change the time on the Face Clock:

1. Click on any of the hands: hour, minute, or second (if the *Show seconds* option is on), and drag it to show any desired time.
2. When the Face Clock time changes, the Digital Clock will immediately show the same time.

To change the time on the Digital Clock:

1. Click on the up (later) and down (earlier) arrow buttons for hours, minutes or seconds.
2. The corresponding hand on the Face Clock moves to keep the clocks showing the same time.

Learning objects	LO ID	Years
Time: analog and digital clocks	3548	P–6
Time: match clocks	3549	P–6
Time: what time will it be?	3550	P–6

This series contains non-TLF content. See Acknowledgements in the learning objects.

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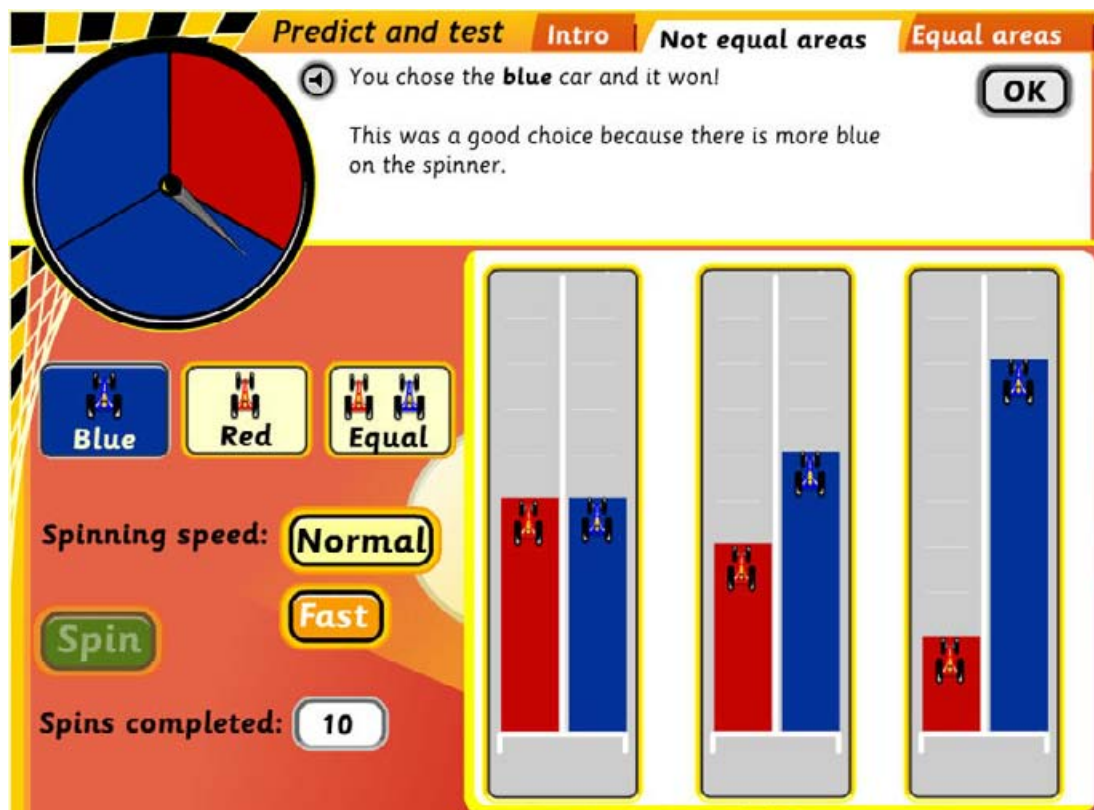
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## Chance and data: chance focus

### Spinners (Years P–3)

The Spinners series provides students with opportunities to explore basic concepts, language and reasoning relating to chance and data.



Learning objects	LO ID	Years
Spinners: predict and test	2378	P–1
Spinners: spin and label	2379	1–2
Spinners: explore	2380	2–3

Students construct spinners to investigate and test the relationship between the structure of a random generator (sample space) and the likelihood of individual outcomes or results from a series of outcomes. The rapid generation of data in dynamic tables and graphs allows an introduction to the notion of long-run data being more reliable than short-run data.

#### Spinners: predict and test

Sectors on the spinner represent two different cars that are racing along a track of 10 spaces, with each spin determining which car moves forward one space towards the finish line. The student assesses the likelihood of each car winning the race when using a spinner of equal or biased nature to determine which car moves further.

Mathematical focus is on awareness of equal and unequal likelihood and also on beginning to explore the relationship between sample space and likelihood of outcomes. Data emphasis is on result of each spin.

#### Spinners: spin and label

The student chooses one of three spinners in response to a likelihood statement, then 'tests' the spinner with 10 spins.

The student repeats the process with the other two spinners. The task concludes with student selecting likelihood statements to match with each spinner.

Mathematical focus is on experiencing the collection of frequency data (result of each spin) and relating this to the sample space (spinner). The link between sample space and likelihood of outcomes (equally likely, less likely, more likely) is also included. Data emphasis is on the result of each spin. Descriptive language is used to express relationships and likelihood.

**Spinners: explore**

The student starts with an equal spinner of three different colours. Before starting a trial the student must observe the sample space of the spinner and make a prediction as to the most likely outcomes of the result of the trial. The student then runs a trial of 1000 spins only. A dynamic graph changes to reflect outcomes of the trials. A miniature of the spinner and graph are retained as a record.

The student alters sizes of sectors and initiates another series of trials, with results shown on a graph. A miniature of the spinner and graph is retained as a record. This is repeated with a third spinner.

The student is presented with six labels to consider, then matches the most appropriate label to each of the three spinners, eg 'Same chance for each colour', 'Red will spin more often than other colours', 'Less chance for yellow'.

Mathematical focus is on awareness of equal likelihood, less likely, more likely, and exploring the relationship between sample space and likelihood of outcomes. Data emphasis is on the result of each spin and introduces the notion of long run data being more informative about likelihood.



## Science

The TLF Science content is based on current research findings in science education and pedagogy. They foster scientific inquiry, data interpretation, analysis and synthesis skills that are transferable to daily life and to offline learning opportunities.

The learning objects promote scientific literacy and are organised around scientific concepts with real-life application for students. They contain open-ended investigative tasks, tools, activities, and processes that enable students to engage in 'real' science experiences and to construct and test their own scientific understandings.

Many of the learning objects also provide meaningful models, simulations and demonstrations of scientific concepts and practices. These provide teachers and students with experiences that are not universally available because, for example, they require expensive equipment or occur over extended periods of time.

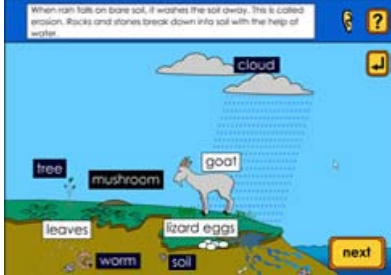





## Earth and beyond

Earth and beyond learning objects released to date are grouped into the series shown below.

### Soil series (Years P–2)

Students explore the properties of natural soil environments and the interactions between the living and non-living components that contribute to healthy soil.




#### Learning objects

	<p><b>Explore soil [includes spoken instructions]</b></p> <p>L2 – Years P–2</p> <p><b>Explore soil</b></p> <p>L187 – Years P–2</p> <p>Students explore how soil is formed from rock particles and organic matter and how plants and animals interact with the soil.</p>
	<p><b>Create a soil environment [includes spoken instructions]</b></p> <p>L3 – Years P–2</p> <p><b>Create a soil environment</b></p> <p>L188 – Years P–2</p> <p>Students grow flowers or vegetables in a garden bed and compare results in different environmental conditions when adding things such as water, organic matter, digging tools and earthworms.</p>
	<p><b>Soil types [includes spoken instructions]</b></p> <p>L4 – Years P–2</p> <p><b>Soil types</b></p> <p>L189 – Years P–2</p> <p>Students examine the properties of three different soil types: sand, loam and clay and explore the effects of compaction and water content on the soil.</p> <p>There is a printout available.</p>
	<p><b>Soil [includes spoken instructions]</b> </p> <p>(L68) – Years P–2</p> <p><b>Soil</b> </p> <p>(L205) – Years P–2</p> <p>'Soil' is an aggregated learning object combining the three other learning objects.</p> <p>There is a printout available.</p>

## Water series (Years P–2)

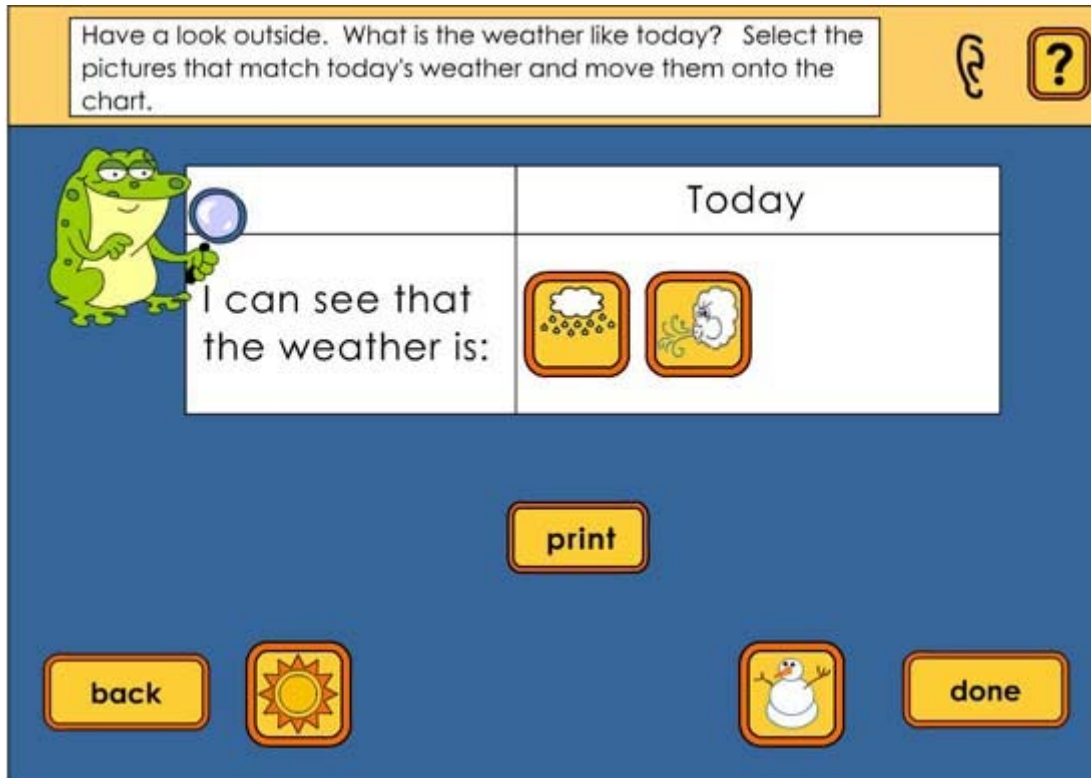
Students explore the quality of water in different aquatic habitats and to associate aquatic animals with their habitats according to water types.

### Learning objects

	<p><b>River journey [includes spoken instructions]</b></p> <p>L5 – Years P–2</p> <p><b>River journey</b></p> <p>L190 – Years P–2</p> <p>Students move Frog down a river in a boat, stopping at four locations: a creek, a waterfall, a river mouth and a bay. Using equipment in the boat, Frog can check the water at each location for temperature, salinity, clarity and current speed. At the end of the journey, students meet four different animals and predict the habitats in which they live.</p>
	<p><b>Water types [includes spoken instructions]</b></p> <p>L6 – Years P–2</p> <p><b>Water types</b></p> <p>L191 – Years P–2</p> <p>Students help Gecko test water samples for salinity levels and sediment content from five different aquatic habitats: a river, the sea, a mangrove estuary, a stream and a dam. Students compare the salinity and clarity of the water samples, matching them with their original habitats.</p>
	<p><b>Waterways</b> 🧩</p> <p>L69 – Years P–2</p> <p><b>Waterways [includes spoken instructions]</b> 🧩</p> <p>L206 – Years P–2</p> <p>This is an aggregated learning object combining the two other learning objects.</p>

## Weather series (Years P–2)

Students explore variations in weather and how the variations affect human behaviour.



Learning objects	LO ID	Years
Explore the weather [includes spoken instructions]	9	P–2
Explore the weather	193	P–2
Experience the weather [includes spoken instructions]	10	P–2
Experience the weather	194	P–2
Weather wear [includes spoken instructions]	11	P–2
Weather wear	195	P–2
Weather [includes spoken instructions] 🧩	71	P–2
Weather 🧩	207	P–2

'Experience the weather' and 'Weather' contain non-TLF content. See Acknowledgements in the learning objects.

### Explore weather

Students help Frog explore elements related to particular types of weather.

### Experience weather

Students explore the links between the climates of four locations: Antarctica, the Sahara desert, the New Zealand mountains, and the Amazon rainforest. Using a palette of choices, students select weather conditions typical of each location.

### Weather wear

Set on a sailing boat, students hear and/or read weather forecasts. They then prepare Gecko and the boat for the weather ahead. Students can also determine the weather conditions and explore the results.

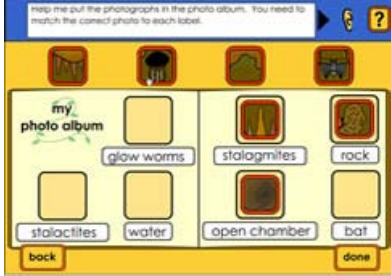





### Weather

This is an aggregated learning object combining the three other learning objects.

## Under the Earth series (Years P–2)

Students explore the structures, composition and life forms that exist in subterranean landscapes.

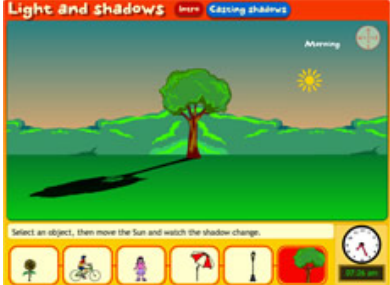



### Learning objects

	<p><b>Caving [includes spoken instructions]</b></p> <p>L12 – Years P–2</p> <p><b>Caving</b></p> <p>L196 – Years P–2</p> <p>Students guide Frog through a limestone cave as he stops at different points to examine, photograph or collect specimens. The activity concludes with a labelling exercise.</p>
	<p><b>Volcanoes [includes spoken instructions]</b></p> <p>L13 – Years P–2</p> <p><b>Volcanoes</b></p> <p>L197 – Years P–2</p> <p>Students assist Gecko to direct a robot as it is lowered into a vent in order to examine the action of a volcano prior to eruption. The robot provides the opportunity for students to observe changes in temperature, soils and rocks. The activity concludes with a labelling exercise.</p>
	<p><b>Mineshaft [includes spoken instructions]</b></p> <p>L14 – Years P–2</p> <p><b>Mineshaft</b></p> <p>L198 – Years P–2</p> <p>Students examine the links between the resources mined or found underground, and their uses above the ground.</p>
	<p><b>Under the Earth [includes spoken instructions]</b></p> <p></p> <p>L72 – Years P–2</p> <p><b>Under the Earth</b> </p> <p>L208 – Years P–2</p> <p>This is an aggregated learning object combining the three other learning objects.</p>

## Light and shadows series (Years P–2)

Students explore the way shadows are created and the impact that different shapes can have on their shadows.

### Learning objects

	<h3>Light and shadows: casting shadows</h3> <p>L1126 – Years P–2</p> <p>After an introduction that carefully explains the reasons why and how shadows are created, students examine the way different shapes can generate different shadows. With the ability to move the Sun, students can see the different shadows cast at different times of the day.</p>
	<h3>Light and shadows: matching shadows</h3> <p>L1127 – Years P–2</p> <p>After an introduction that carefully explains the reasons why and how shadows are created, students examine the way different shapes can generate different shadows. With the ability to move the Sun, students can see the different shadows cast at different times of the day.</p>
	<h3>Light and shadows </h3> <p>L756 – Years P–2</p> <p>This is an aggregated learning object combining the two other learning objects.</p>



Day and night (Years P–2)

Students observe the changing sky as day becomes night and then night turns into day again.



Learning objects	LO ID	Years
Day sky, night sky [includes spoken instructions]	20	P–2
Day sky, night sky	204	P–2

Students help Frog identify objects in the sky: the Moon, a star, a planet, the Sun, a cloud and a star group. Students then create their own sky scene using the elements supplied. The completed picture can be printed.

## Water use series (Years P–2)

Students explore features of water in a built human environment.

Thanks for helping me with my investigations. Frogs can lay their eggs in any type of water but only some places are good for frog eggs to survive and grow in.

open drain

swimming pool

river mouth

rain puddle

### My Frog Report

Today, I found that frogs can lay their eggs in

shallow creek

garden pond

wetland

dam

and \_\_\_\_\_.

back

print

restart

Learning objects	LO ID	Years
Where do frogs lay their eggs? [includes spoken instructions]	17	P–2
Where do frogs lay their eggs?	201	P–2
Explore water pipes [includes spoken instructions]	18	P–2
Explore water pipes	202	P–2
Where does tap water come from? [includes spoken instructions]	19	P–2
Where does tap water come from?	203	P–2
Water use [includes spoken instructions]	74	P–2
Water use	210	P–2

'Explore water pipes' and 'Water use' contain non-TLF content. See Acknowledgements in the learning objects.

### Where do frogs lay their eggs?

Students examine different bodies of water, both permanent and temporary, that commonly exist in the built environment and consider their suitability as a place for a frog to lay its eggs. Students investigate the sites and record their findings in a printable 'Frog report'.

### Explore water pipes

Students help Gecko to trace a city's water supply and disposal. They collect and test water samples from six locations: a dam, a water treatment plant, a pumping station, a house, a sewerage treatment plant and a creek outfall. They then compare the water clarity and purity, matching the samples with their original locations.

### Where does tap water come from?

Students complete a click-and-drag jigsaw puzzle, which enables them to understand the water cycle from the perspective of a household user in the country or in a city.

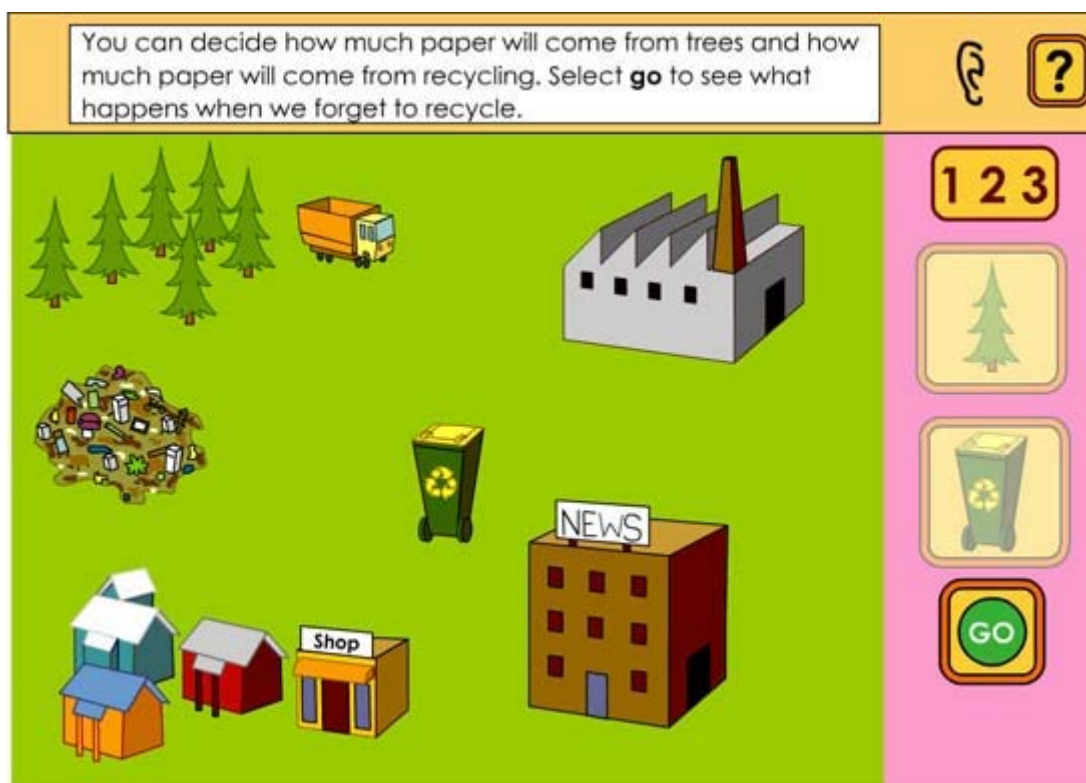
### Water use



This is an aggregated learning object combining the three other learning objects.



## Land use series (Years P–2)

Students explore human impact on the environment.



Learning objects	LO ID	Years
News story [includes spoken instructions]	15	P–2
News story	199	P–2
New developments [includes spoken instructions]	16	P–2
New developments	200	P–2
Land use [includes spoken instructions] 	73	P–2
Land use 	209	P–2

### News story

Students follow the production cycle of a newspaper from a forest plantation to a paper mill, to a printing press, to a newsagent, to its readers and finally to waste paper and recycling. They discover how recycling can reduce demand on natural resources.

### New developments

Students explore the impact of built environments such as houses, roads and shopping centres on the natural environment. They help Gecko survey populations of mammals and birds, and explore the balance between development and wildlife conservation. Simulated environments include national parks, creeks, wetlands, bridges, towns and farms.

### Land use

This is an aggregated learning object combining the two other learning objects.

## Life and living

### Garden detective series (Years P–2)




Students explore and classify many small living creatures found in Australian and New Zealand gardens.

#### Teacher notes

- Each of these learning objects has a print option, which allows students to keep a record of their collections with the accompanying information about each animal.

#### Learning objects

	<p><b>Garden detective: explore a New Zealand garden</b></p> <p>L1182 – Years P–2</p> <p>Students examine the garden with the magnifying glass looking for different creatures. Once found, a description of the creature with some of its distinguishing characteristics is displayed. Students can then choose whether to include the creature in their collection or to move on to look for others. They can print the collection and continue on to make several collections. There are 24 creatures hidden in the garden.</p>
	<p><b>Garden detective: group New Zealand animals</b></p> <p>L1183 – Years P–2</p> <p>Students use the magnifying glass to find New Zealand creatures in the garden. Students are challenged to find groups of animals with like characteristics. For example, three creatures with wings.</p>
	<p><b>Garden detective: New Zealand garden</b> 🧩</p> <p>L1181 – Years P–2</p> <p>This is an aggregated learning object combining the two other New Zealand garden learning objects in a sequence.</p>
	<p><b>Garden detective: explore an Australian garden</b></p> <p>L1118 – Years P–2</p> <p>Students examine the Australian garden with the magnifying glass looking for different creatures. Once found, a description of the creature with some of its distinguishing characteristics is displayed. Students can then choose whether to include the creature in their collection or to move on to look for others. They can print the collection and continue on to make several collections. There are 24 creatures hidden in the garden.</p>

	<p><b>Garden detective: group Australian animals</b></p> <p>L1119 – Years P–2</p> <p>Students use the magnifying glass to find Australian creatures in the garden. In this learning object students are challenged to find groups of animals with like characteristics, for example, three creatures with wings.</p>
	<p><b>Garden detective: Australian garden</b> </p> <p>L699 – Years P–2</p> <p>This is an aggregated learning object combining the two other Australian garden learning objects in a sequence.</p>





## Food chains series (Years P–2)

Students explore how plants and animals get the energy to live. Students are able to create simple food chains that show the flow of energy from the sun to plants and on to animals.

### Teacher notes

- Each learning object has audio support and three levels of difficulty.
- The feedback and scaffolding of the learning tasks is not text dependent.

### Learning objects

	<p><b>Food chains: introduction</b></p> <p>L1147 – Years P–2</p> <p>This is a simple animation that introduces students to the concept of a food chain. It can stand alone as a resource, but is also packaged as an introduction to the other objects in this series.</p>
	<p><b>Food chains: the town</b></p> <p>L894 – Years P–2</p> <p>Students create simple food chains starting with the energy from the Sun, and then incorporate plants and animals typically found in a city park. Each of the food chains the students create is recorded as a clear, simple graphic representation.</p>
	<p><b>Food chains: the desert</b></p> <p>L1143 – Years P–2</p> <p>Students create simple food chains starting with the energy from the Sun, and then incorporate plants and animals typically found in a desert. Each of the food chains the students create is recorded as a clear, simple graphic representation.</p>
	<p><b>Food chains: the wetlands</b></p> <p>L1144 – Years P–2</p> <p>Students create simple food chains starting with the energy from the Sun, and then incorporate plants and animals typically found in a wetlands environment. Each of the food chains the students create is recorded as a clear, simple graphic representation.</p>



**Food chains: the farm**

L1145 – Years P–2

Students create simple food chains starting with the energy from the Sun, and then incorporate plants and animals typically found on a farm. Each of the food chains the students create is recorded as a clear, simple graphic representation.



**Food chains: the forest**

L1146 – Years P–2

Students create their own simple food chain with the energy from the sun, and then incorporate plants and animals typically found in a forest. Each of the food chains the student creates is recorded as a clear, simple graphic representation.



## Animal search series (Years 1–2)


Students analyse the physical features of a group of animals and to use that information to classify the animals as fish, amphibian, reptile or mammal.

### Teacher notes

- Students are presented with a selection of animals and determine which of them fit a specific classification
- Students progressively eliminate animals from the category by examining features common to the specific classification.
- Common misconceptions are addressed.
- The series has audio support to assist pre-readers and also provides clear visual feedback.

### Learning objects

	<p><b>Animal search: is it a mammal?</b></p> <p>L766 – Years 1–2</p> <p>Students classify mammals. Includes animals such as a crocodile. After further interaction the mammal is discovered based on a feature such as the ability to make milk to feed its young.</p>
	<p><b>Animal search: is it a reptile?</b></p> <p>L1135 – Years 1–2</p> <p>Students determine which animals are reptiles. Includes animals such as a tortoise. Students look for features such as whether the animal has tough, dry skin and is covered in scales.</p>
	<p><b>Animal search: is it an amphibian?</b></p> <p>L1136 – Years 1–2</p> <p>Students determine animals are amphibians. Includes animals such as an eel. Students look for features such as whether the animal lays eggs when it is an adult.</p>
	<p><b>Animal search: is it a fish?</b></p> <p>L1137 – Years 1–2</p> <p>Students determine which animals are fish. Includes animals such as a jellyfish. Students look for features such as whether the animal breathes with gills.</p>

	<p><b>Animal search</b> 🎮</p> <p>L1134 – Years 1–2</p> <p>This is an aggregated learning object combining the four other learning objects.</p>
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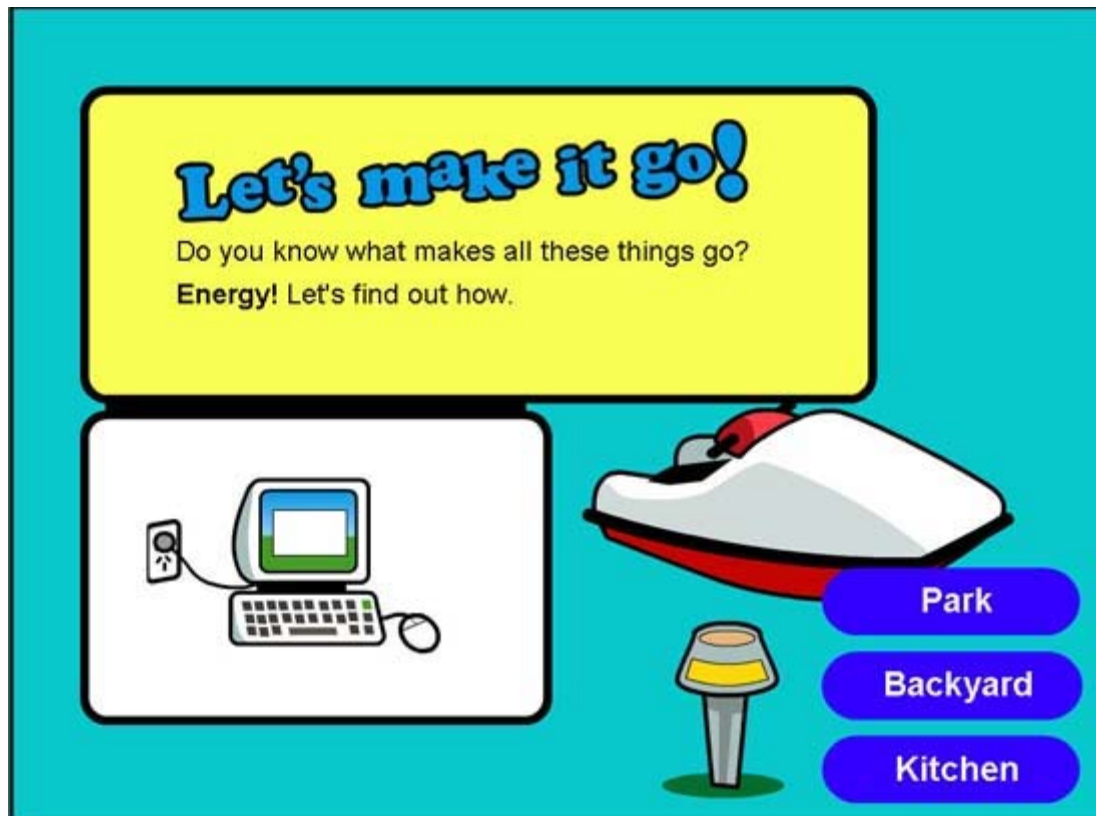


## Energy and change

The *Energy and change* learning objects released to date are grouped into series as shown.

### Let's make it go (Years P–1)

The Let's make it go series examines what it is that 'powers' everyday objects in everyday environments.



Learning objects	LO ID	Years
Let's make it go: at the park	847	P–1
Let's make it go: backyard	953	P–1
Let's make it go: in the kitchen	954	P–1
Let's make it go 🧩	955	P–1

Students are offered a number of alternatives such as sun, wind, water, batteries, electricity, gas and petrol as they investigate each object and choose the most appropriate energy source for each. Students are rewarded with the animation of making the object 'go'.

#### Let's make it go: at the park

Using the park environment and objects easily associated with this environment, such as barbecues, boats and sprinklers, students are guided towards each object and introduced to their different types of power sources.

#### Let's make it go: backyard

Using a home backyard and objects easily associated with this environment, such as a drill, mower and family car, students are guided towards each object and introduced to their different types of power sources.

#### Let's make it go: in the kitchen

Using the kitchen and objects easily associated with this environment, such as a dish washer, oven, refrigerator and radio, students are guided towards each object and introduced to their different types of power sources.

**Let's make it go**

This is a single aggregated learning object combining the other learning objects.




## Mixing colours series (Years P–2)

Students experiment with mixing primary colours to create new colours. Using the mixing machine, students are able to add different volumes of paints to create colours that they can then use to paint predefined pictures.

### Teacher notes

- Each learning object has three levels of difficulty
- Students can print their completed picture, which also shows the proportions of primary colours used to make each colour.

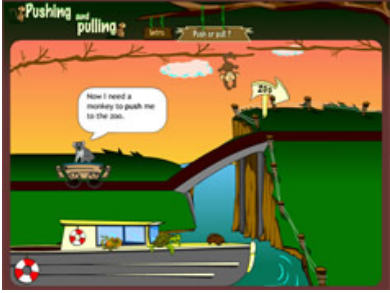



### Learning objects

	<p><b>Mixing colours: paint</b></p> <p>L1116 – Years P–2</p> <p>Students use the mixing machine to mix primary colours to form different colours. Students can then select from a range of pictures and paint it using the colours they have created.</p>
	<p><b>Mixing colours: match</b></p> <p>L1117 – Years P–2</p> <p>Students select a picture and use the mixing machine to create colours to match those in the selected picture. They then paint a replica of their selection.</p>
	<p><b>Mixing colours</b> 🎨🎨</p> <p>L686 – Years P–2</p> <p>This is an aggregated learning object combining the two other learning objects.</p>

## Pushing and pulling series (Years P–3)

Students experiment with force and mass by using non-standard labour units (in the form of monkeys) to help move recently arrived animals to the zoo.

### Learning objects

	<p><b>Pushing and pulling: push or pull?</b></p> <p>L1120 – Years P–1</p> <p>Students discover the difference between ‘push’ and ‘pull’ as they are asked to move four small animals, of similar mass across the bridge using ‘monkey power’.</p>
	<p><b>Pushing and pulling: how much force?</b></p> <p>L1121 – Years P–2</p> <p>The animals to be moved are of different sizes and therefore different masses. To move them will require different amounts of force. Students need to move the animals using the correct number of monkeys – too few and the cart can’t be moved, too many monkeys leads to a crash!</p>
	<p><b>Pushing and pulling: zoo move</b></p> <p>L1122 – Years P–3</p> <p>Students are limited to a finite pool of monkeys to move the animals. Using too many monkeys will crash the cart and there won’t be enough left to get all the animals across.</p>
	<p><b>Pushing and pulling</b> 🧩</p> <p>L700 – Years P–3</p> <p>This is an aggregated learning object combining the three other learning objects.</p>





## Working scientifically

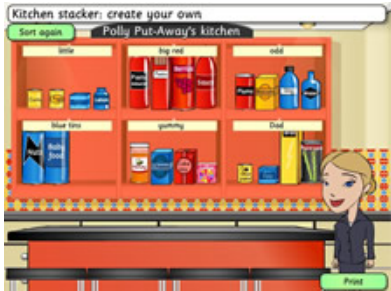


The learning objects in the *Working scientifically* strand are designed to help students develop investigative and analytical skills to extend their understanding in Science, and to develop positive attitudes towards Science and the work of scientists.

### Kitchen stacker series (Years 1–3)

Students discover that common properties and attributes form the basis for classification systems. Students help Felix Fusspot, Tina Tidy and Polly Put-Away organise grocery items in kitchen cupboards according to common properties, for example size, colour or container type. They learn that items with more than one common property can be grouped in different ways.

#### Learning objects

	<p><b>Kitchen stacker: sort the groceries 1</b></p> <p>L2347 – Years 1–2</p> <p>Students drag and drop groceries into kitchen cupboards according to one common property such as size, colour or container type, for example as large, red or boxes. Labels on the cupboards provide written cues. Students then group the items according to two common properties.</p>
	<p><b>Kitchen stacker: sort the groceries 2</b></p> <p>L2348 – Years 1–2</p> <p>Students drag and drop groceries into kitchen cupboards according to a common property such as size, colour or container type. This time there are no labels on the cupboards. They sort by matching to an initial visual cue. Students are then extended to group the objects according to two common properties.</p>
	<p><b>Kitchen stacker: sort and label</b></p> <p>L2349 – Years 2–3</p> <p>Students sort items with two common properties into five cupboards. The learning object dynamically displays category labels that correspond to shared properties to assist the students.</p>
	<p><b>Kitchen stacker: label the cupboards</b></p> <p>L2350 – Years 1–2</p> <p>Students sort items with three common properties into six cupboards. The learning object dynamically displays category labels that correspond to shared properties to assist the students.</p>

	<p><b>Kitchen stacker: create your own</b></p> <p>L2351 – Years 2–3</p> <p>Students drag and drop groceries into six kitchen cupboards sorting them according to a common property of their own choosing. Students then label their cupboards and can print their work, which show the items in the labelled cupboards.</p> <p>A printout of the student's labelled work is available.</p>
	<p><b>Kitchen stacker 1</b> 🧩</p> <p>L2345 – Years 1–2</p> <p>This is an aggregated learning object combining 'Kitchen stacker: sort the groceries 1', 'Kitchen stacker: sort the groceries 2' and 'Kitchen stacker: sort and label'. It has audio support.</p>
	<p><b>Kitchen stacker 2</b> 🧩</p> <p>L2346 – Years 2–3</p> <p>This is an aggregated learning object combining 'Kitchen stacker: sort the groceries 1', 'Kitchen stacker: sort the groceries 2', 'Kitchen stacker: label the cupboards' and 'Kitchen stacker: create your own'.</p> <p>A printout of the student's labelled work is available from 'Kitchen stacker: create your own'.</p>



## Studies of Australia

The Studies of Australia learning objects support the study of Australian history, geography, environmental studies, values and cultural studies, with some focus on people in regional and rural areas. Students are invited to interrogate, analyse and synthesise information, think critically, solve problems and make decisions. The learning objects released to date focus on shaping Australia's identity and shaping the future.

### Australian history

The Australian history set of learning objects focuses on helping students understand where different Australian identities originated and how they have been shaped. Students are encouraged to explore a range of temporal, spatial, cultural, economic, environmental, socio-political and value perspectives to understand present Australian identities and ways of seeing themselves.

#### Golden fleece (Year P–2)

Students are presented with an unusual and unknown object. Through a series of four activities, they are invited to work out what this object is. At each stage of their interrogation they become increasingly informed.



Learning object	LO ID	Years
Golden Fleece	681	P–2

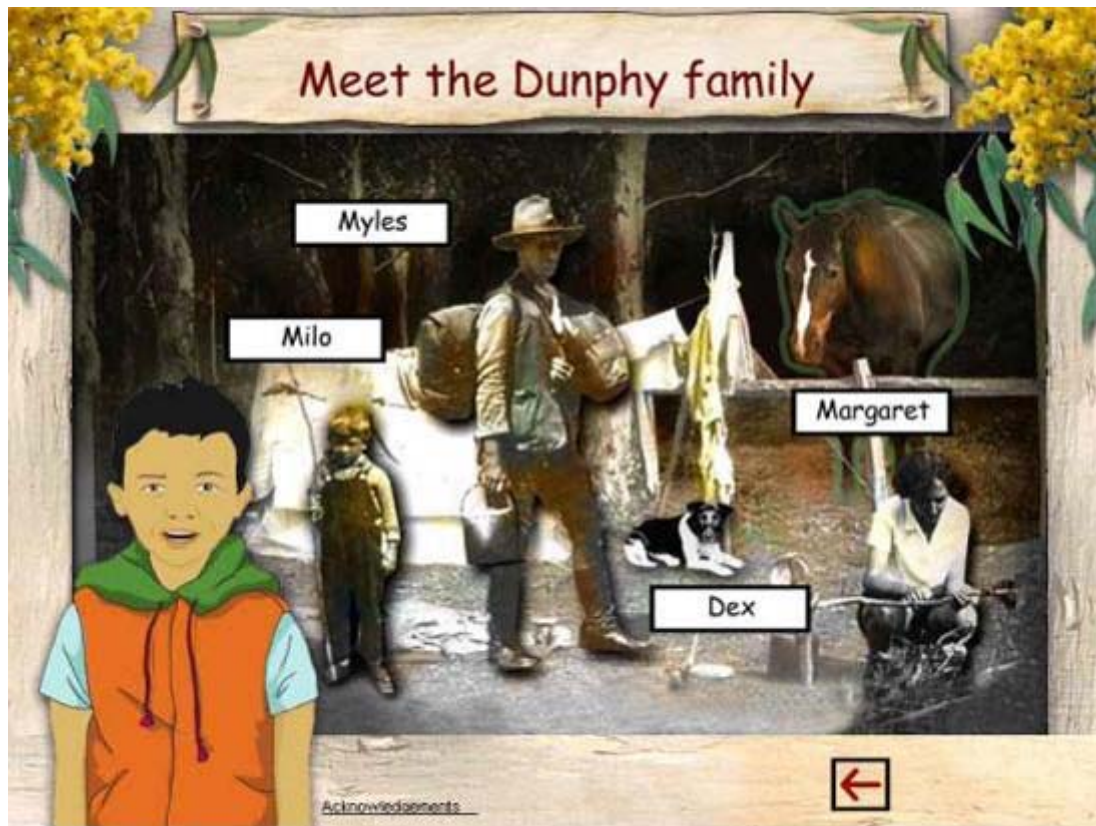
'Golden Fleece' contains non-TLF content. See Acknowledgements in the learning object.

Students discover that the object is the Ferrier wool press, which was manufactured around 1878, and used for over 100 years to compact loose fleeces into bales. They learn that Australia has lots of sheep, that sheep make wool, and that this important industry produces many familiar items.



## National parks (Years P–2)

In the National parks series, students explore some unusual artefacts created by Myles Dunphy, an early Australian bush conservationist.



Learning objects	LO ID	Years
National parks: boots in the bush	669	P–2
National parks: wheels in the bush	932	P–2

This series contains non-TLF content. See Acknowledgements in the learning objects.

In both of these objects young students are assisted by Ben, a young boy in the Blue Mountains region of New South Wales. Ben introduces students to the Dunphy family as they camp in a bushland setting. Myles Dunphy was one of the founders of Australia's Conservation movement in the 1930s. He created some unusual objects to help his family enjoy the Australian bush in more comfort.

### National parks: boots in the bush

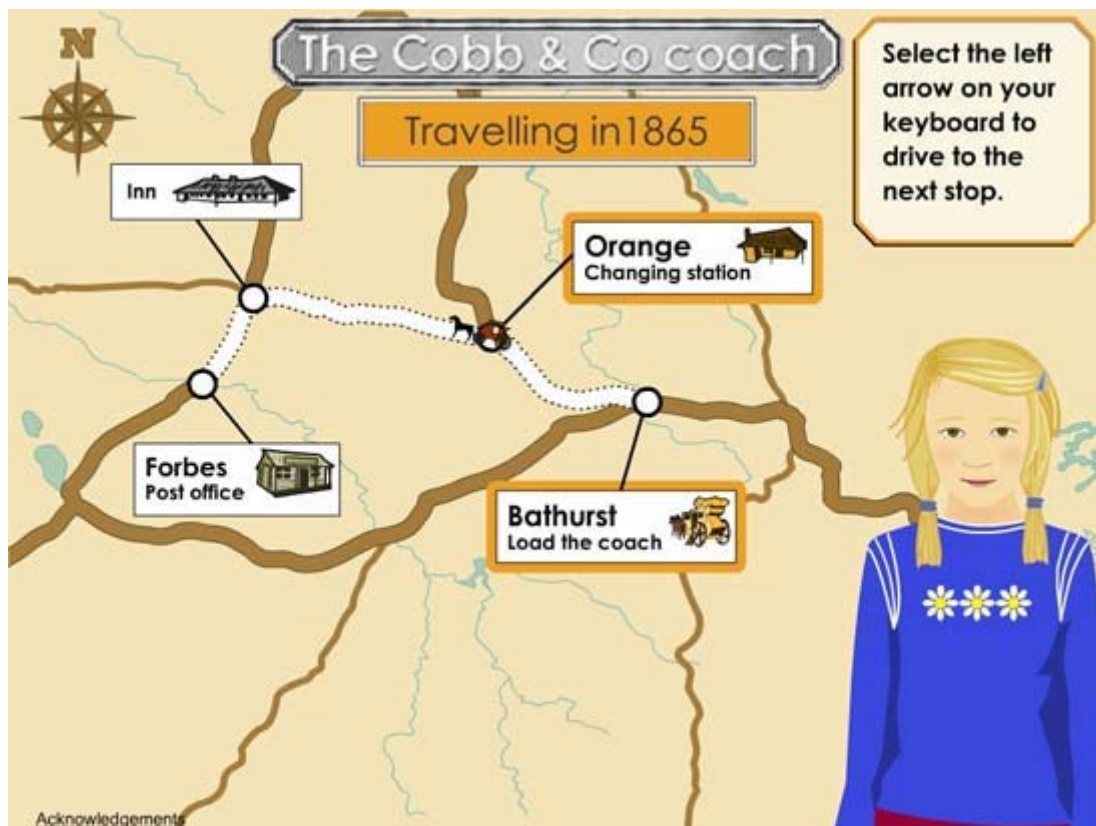
In 'National parks: boots in the bush', students are invited to examine some unusual boots and work out their purpose. The boots are a set of 'dogboots' which Myles Dunphy made for his dog to accompany the family on long bushwalks. As they examine the boots and find out about members of the Dunphy family, students discover the difference between National Parks and other areas. Students are prompted to decide who the boots belong to and receive assistive feedback to complete the identification. Finally, students look at a map showing the major National Parks in Australia.

### National parks: wheels in the bush

In 'National parks: wheels in the bush', students examine a pram customised by Myles Dunphy to take his young son on long bushwalks. The pram unfolds and more information about National Parks is uncovered as the students explore the pram. Finally, students look at a map showing the major National Parks in Australia.

## The Cobb & Co coach (Years P–2)

With the help of an onscreen narrator, students explore how people travelled and sent messages 140 years ago.



Learning objects	LO ID	Years
The Cobb & Co coach	675	P–2

'The Cobb & Co coach' contains non-TLF Content. See Acknowledgements in the learning object.

Students examine a genuine horse-drawn Cobb & Co coach made in the 1860s. Images and narration explain the parts of the coach, such as the roof, wheels, boot and horses, and compare the travelling experience with a similar experience today. Students load the luggage and people onto the coach, then trace the journey of coach passengers, including rest stops, on a mail delivery trip through country New South Wales. Students compare the travel experience with a similar trip on a modern bus, and then see how much faster travel is today using transport such as trains, cars and planes.

## Civics and citizenship

The Civics and citizenship set of learning objects encourages young Australians to develop positive, productive and optimistic views of the future by clarifying the future they want and identifying the contributions they need to make for it to become a reality.

### Your rules (Years P–2)

Students are encouraged to consider how to get along with others.



Learning objects	LO ID	Years
Playground rules	949	P–2
Your rules: in the park	6351	P-2
Your rules: in the supermarket	6352	P-2

Children are shown in a common setting where they do not appear to be getting on well together. As students select each situation they are asked to determine ways of addressing the concerns. When they have selected the appropriate responses, the consequences of their decisions are revealed in the playground setting. Students arrive at a set of rules that promote sharing, participation and consideration of others.

Your rules is useful for students who are beginning school, or in settings where conflict may be occurring.

#### Playground rules

The situations include: a child refusing to share; another child stealing food; someone making fun of another; litter being scattered on the ground; and a child being left out of a game.

#### Your rules: in the park

Students encounter situations including a child chasing away birds, one child pushing another, dog droppings being left on the ground, a child destroying another's sandcastle, and a child wandering away from their family.

**Your rules: in the supermarket**

Students encounter situations including a child needing to go to the toilet, children not sharing, a child pestering a parent, children chasing each other in a shop, and a child taking something that doesn't belong to them.



## What's your job? (Years P–2)

By introducing students to a range of Australian families, 'What's your job?' learning object helps students realise that Australian families vary in size, age, location, ethnicity, structure and responsibilities.



Learning objects	LO ID	Years
What's your job?	1006	P–2

Students visit a number of families and consider the jobs undertaken by different family members. The families include an extended family, a single-parent family, a nuclear family, a family in which children are raised by relatives rather than their parents, and a family with a step-parent. A range of cultures and geographical locations is featured in the depiction of the families.

After matching people to jobs, students identify the number of people in the families and the jobs undertaken in their homes. Then they have the option of printing the information and matching the family members with the jobs they do.

## Make the rules (Years P–2)

The Make the rules series introduces students to the need for rules in some situations. Students are prompted to make some rules while engaged in a soccer-based computer game that has some unexpected twists.



Learning objects	LO ID	Years
Make the rules: fair play	1007	P–2

A number of strange things happen when students begin to play a new soccer-based computer game. Extra goalies appear from nowhere, the goals change size or move away suddenly, and the ball changes size and direction. When the unusual events occur, students are prompted to suggest rules that will make the game fun and fair. When they have corrected the rules, students have five kicks at goal to obtain the highest score they can.

## Island life (Years P–2)

Students are asked to distinguish between needs and wants when selecting six items that will ensure their survival on a tropical island.



Learning objects	LO ID	Years
Island life: needs and wants	1008	P–2

This series contains non-TLF content. See Acknowledgements in the learning objects.

This learning object prompts students to distinguish between needs and wants in an engaging and fun manner. To survive on a tropical island, students choose six items to take with them. When they arrive on the island the consequences of their choices become apparent. If they have chosen unwisely people get sick, the water becomes polluted, rubbish accumulates, trees disappear and buildings fall into disrepair. Students are prompted to revise their selections on subsequent visits to the mainland.



**Job match** (Years 1–2)

The Job match series challenges stereotypes. Students select characters to fulfill different jobs. If they make their selections based on appearances only, students are in for some surprises.



Learning objects	LO ID	Years
Job match: save the day	1009	1–2

When presented with a sequence of emergencies, students select characters to resolve the respective crises. The characters do not always behave in predictable ways. The learning object challenges a number of stereotypes when students choose someone to put out a house fire, provide medical care for an injured neighbour, then rebuild the damaged house.

Students are prompted, but not forced, to talk to each character before selecting them. If they do choose to talk to them, their task is much easier.

## ***Sustainability and environmental education focus***




### **Make it alive series** (Years P–4)





This series helps students understand the habitat, threats and survival needs of endangered Australian animals and birds in a game-like environment.

#### **Teacher notes**

- Students are challenged to explore ways to help the creature stay alive by avoiding predators, finding food or locating shelter in the environment.
- Simulates the behaviour of a predator and competitor species, and the dangers faced by the species in its habitat over the period of a single day or night.
- Students have to be aware of the special features of each habitat in order to help the creature.
- Supports repeated use.

#### **Learning objects**

	<p><b>The night of the bilby: find food</b> L896 – Years P–2</p> <p>Students help bilbies gather food including seeds, bulbs and spiders while avoiding feral predators such as cats and foxes and competing with rabbits.</p> <p>The environment is the desert at night.</p>
	<p><b>The night of the bilby: get home alive</b> L907 – Years 3–4</p> <p>Students help bilbies gather food including seeds, bulbs and spiders while avoiding feral predators such as cats and foxes and competing with rabbits.</p> <p>This learning object is similar to the 'night of the bilby: find food', however students have less time to complete the activity.</p> <p>The environment is the desert at night.</p>
	<p><b>The night of the bilby: safe habitat</b> L908 – Years 3–4</p> <p>Students determine how many bilbies a desert habitat can support by trapping and weighing insects, which form a significant part (up to 70 per cent) of the bilby diet.</p> <p>Students identify tracks in the desert sand to determine the presence of predators, then take steps to remove the predators.</p>

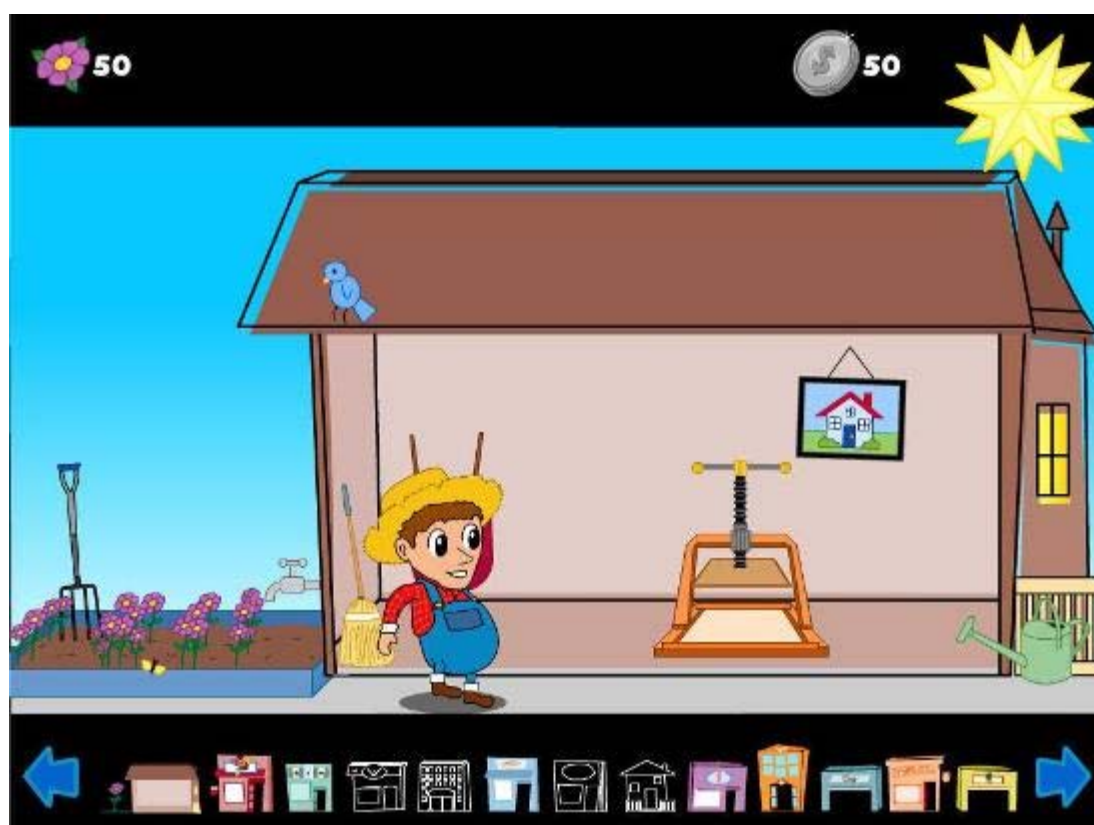
	<p><b>Make it alive: superb parrots</b></p> <p>L6357 – Years 3–4</p> <p>Students help a superb parrot to escape from dangerous feral cats, find sufficient food, then search for an empty tree hollow to safely nest in.</p> <p>Students discover how feral birds and insects such as Indian Mynahs, starlings and honeybees are affecting the parrots' survival by occupying tree hollows.</p> <p>The environment is a woodland habitat during daytime.</p>
	<p><b>Make it alive: brush-tailed rock wallabies</b></p> <p>L6355 – Years 3–4</p> <p>Students help the rock wallaby to find enough food, such as flowers, native grasses and their seeds, and to search for safe places to hide from dangerous wild dogs to survive. They discover that feral animals such as goats, which eat the same plants, are affecting their chances of survival.</p> <p>The environment is a steep rocky habitat at night.</p>
	<p><b>Make it alive: spotted tree frogs</b></p> <p>L6358 – Years 3–4</p> <p>Students discover what developing frogs eat then help them find enough food so they develop from the tadpole stage through to adulthood. They help the tadpoles escape from predatory fish, such as the introduced rainbow trout, and search for safe places in the bottom of the stream habitat for shelter.</p> <p>The environment is a stream habitat.</p>
	<p><b>Make it alive: flatback turtles</b></p> <p>L6356 – Years 3–4</p> <p>Students examine how feral animals such as wild pigs are affecting the flatback turtle's chances of survival. Once the turtles hatch from their nests, students help them to reach the safety of the ocean without being eaten by predators.</p> <p>The environment is a coastal dune and beach habitat at night.</p>

## Business and enterprise

The Business and enterprise online curriculum content is designed to produce rich interactive multimedia learning resources and tools that enable students to engage in learning experiences that enhance their capacities and skills to be innovative, creative and entrepreneurial. Students are immersed in an environment that provides opportunities to explore and synthesise the many components of enterprise environments. Environments are underpinned by industry challenges, resource management and innovation potential.

### Buds (Years P–2)

The Buds series immerses students in an environment as small business operators. Students are encouraged to discover opportunities to sell and innovate on their product to win an award for finding business opportunities.



Learning objects	LO ID	Years
Buds: level 1	902	P–2
Buds: level 1 [includes audio prompts]	905	P–2

The Buds series learning objects have no text and students are compelled to take risks, explore opportunities and, in an immersive multimedia experience, engage in entrepreneurial pursuits.

As a small business operator within the flower industry, the farmer undertakes product innovation and sales through exploring the opportunities for expanding the product range and developing a sustainable reputation. Concepts such as the global market place, sustainable business practice and triple bottom line business practices can be introduced to the students through the use of this series of learning objects.

Level 1 introduces the concept with the discovery of opportunities necessary to win the business award. A version of level 1 also includes audio prompts to provide hints and strategies to assist students in the discovery of various opportunities